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Application No.: 10/740,262

Case No.: 58716US002

Amendments to the Claims:

The following Listing of Claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

- 1. (Currently Amended) A fused polycrystalline material comprising Al₂O₃ and Y₂O₃, wherein at least a portion of the Al₂O₃ present in the fused polycrystalline material is transitional Al₂O₃, and wherein at least a portion of the Al₂O₃ and Y₂O₃ present in the fused polycrystalline material are present as a complex Al₂O₃·Y₂O₃.
- 2. (Original) The fused polycrystalline material according to claim 1, wherein the complex Al₂O₃·Y₂O₃ exhibits a garnet crystal structure.
- 3. (Original) The fused polycrystalline material according to claim 1, wherein the complex Al₂O₃·Y₂O₃ exhibits a perovskite crystal structure.
- 4. (Original) The fused polycrystalline material according to claim 1, wherein the complex Al₂O₃·Y₂O₃ exhibits a microstructure comprising dendritic crystals.
- 5. (Original) The fused polycrystalline material according to claim 4, wherein the dendritic crystals have an average size of less than 2 micrometers.
- 6. (Original) The fused polycrystalline material according to claim 1 comprising at least 50 percent by weight of the Al₂O₃.
- 7. (Original) The fused polycrystalline material according to claim 6, wherein the complex Al₂O₃·Y₂O₃, exhibits a gamet crystal structure.
- 8. (Original) The fused polycrystalline material according to claim 6, wherein the complex Al₂O₃ Y₂O₃, exhibits a perovskite crystal structure.

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- 9. (Original) The fused polycrystalline material according to claim 6, wherein the complex Al₂O₃·Y₂O₃ exhibits a microstructure comprising dendritic crystals.
- 10. (Original) The fused polycrystalline material according to claim 9, wherein the dendritic crystals have an average size of less than 2 micrometers.
- 11. (Currently Amended) A fused polycrystalline particle comprising Al₂O₃ and Y₂O₃, wherein at least a portion of the Al₂O₃ present in the fused polycrystalline material is transitional Al₂O₃, and wherein at least a portion of the Al₂O₃ and Y₂O₃ present in the fused polycrystalline material are present as a complex Al₂O₃·Y₂O₃.
- 12. (Original) The fused polycrystalline particle according to claim 11, wherein the complex Al₂O₃·Y₂O₃, exhibits a garnet crystal structure.
- 13. (Original) The fused polycrystalline particle according to claim 11, wherein the complex $Al_2O_3 \cdot Y_2O_3$, exhibits a perovskite crystal structure.
- 14. (Original) The fused polycrystalline particle according to claim 1, wherein the complex Al₂O₃·Y₂O₃ exhibits a microstructure comprising dendritic crystals.
 - 15. (Original) A plurality of fused polycrystalline particles according to claim 11.
- 16. (Original) The plurality of fused polycrystalline particles according to claim 15 comprising at least 50 percent by weight of the Al₂O₃, based on the total weight of the respective particle.
- 17. (Original) A plurality of particles having a specified nominal grade, wherein at least a portion of the plurality of particles are particles according to claim 16.

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- 18. (Original) The plurality of particles having a specified nominal grade according to claim 17, wherein the complex Al_2O_3 · Y_2O_3 , exhibits a garnet crystal structure.
- 19. (Original) The plurality of particles having a specified nominal grade according to claim 17, wherein the complex Al₂O₃·Y₂O₃, exhibits a perovskite crystal structure.
- 20. (Original) The plurality of particles having a specified nominal grade according to claim 17, wherein the complex Al₂O₃·Y₂O₃, exhibits a microstructure comprising dendritic crystals.
- 21. (Original) The plurality of particles having a specified nominal grade according to claim 20, wherein the dendritic crystals have an average size of less than 2 micrometers.
- 22. (Original) The plurality of particles having a specified nominal grade according to claim 17, wherein the specified nominal grade is at least one of an ANSI, FEPA, or JIS standard.
- 23. (Original) The plurality of fused polycrystalline particles according to claim 16 comprising at least 75 percent by weight Al₂O₃, based on the total weight of the respective fused polycrystalline particle.
- 24. (Original) The plurality of fused polycrystalline particles according to claim 16 comprising at least 85 percent by weight Al₂O₃, based on the total weight of the respective fused polycrystalline particle.
- 25. (Original) The plurality of fused polycrystalline particles according to claim 16 comprising, by weight, the Al₂O₃ in a range from 40 to 90 percent by weight and the Y₂O₃ in a range from 60 to 10 percent by weight, based on the total weight of the respective fused polycrystalline particle.

26-27. (Cancelled)

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28. (Currently Amended) A method of making fused polycrystalline material [[comprising (a) alpha alumina having an average crystallite size in a range from 1 to 10 micrometers, and (b) complex Y₂O₃·metal oxide present as a distinct crystalline phase]], the method comprising:

heating a first fused polycrystalline material, the first fused polycrystalline material comprising Al_2O_3 and Y_2O_3 , wherein at least a portion of the Al_2O_3 is transitional Al_2O_3 , and wherein at least a portion of the Al_2O_3 and Y_2O_3 are present as a complex Al_2O_3 Y_2O_3 to convert at least a portion of the first fused polycrystalline material to alpha alumina to provide a second fused polycrystalline material, the second fused polycrystalline material comprising (a) alpha alumina having an average crystallite size in a range from 1 to 10 micrometers, and (b) complex Y_2O_3 metal oxide present as a distinct crystalline phase.

29-48. (Cancelled)

49. (Currently Amended; Withdrawn) A method of making fused polycrystalline abrasive particles [[comprising (a) alpha alumina having an average crystallite size in a range from 1 to 10 micrometers, and (b) complex Y₂O₃ metal oxide present as a distinct crystalline phase]], the method comprising:

heating a plurality of <u>first</u> fused polycrystalline particles, the <u>first</u> fused polycrystalline particles comprising Al₂O₃ and Y₂O₃, wherein at least a portion of the Al₂O₃ is transitional Al₂O₃, and wherein at least a portion of the Al₂O₃ and Y₂O₃ are present as a complex Al₂O₃·Y₂O₃ to <u>convert at least a portion of the first fused polycrystalline particles to alpha alumina to provide a second fused polycrystalline abrasive particles, the <u>second</u> fused polycrystalline abrasive particles comprising (a) alpha alumina having an average crystallite size in a range from 1 to 10 micrometers, and (b) complex Y₂O₃·metal oxide present as a distinct crystalline phase.</u>

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- 50. (Withdrawn) The method according to claim 49, wherein the fused polycrystalline abrasive particles comprise at least 75 percent by weight AbO₃, based on the total weight of the respective fused polycrystalline abrasive particle.
- 51. (Withdrawn) The method according to claim 49, wherein the fused polycrystalline, abrasive particles comprise at least 85 percent by weight Al₂O₃, based on the total weight of the respective fused polycrystalline abrasive particle.
- 52. (Withdrawn) The method according to claim 49, wherein the fused polycrystalline abrasive particles comprise, by weight, the Al₂O₃ in a range from 40 to 90 percent by weight and the Y₂O₃ in a range from 60 to 10 percent by weight, based on the total weight of the respective fused polycrystalline abrasive particle.
- 53. (Currently Amended; Withdrawn) A method of making fused polycrystalline abrasive particles [[comprising (a) alpha alumina having an average crystallite size in a range from 1 to 10 micrometers, and (b) complex Y₂O₃ metal oxide present as a distinct crystalline phase]], the method comprising:

providing a melt comprising Al_2O_3 and Y_2O_3 ;

shaping the melt into precursor particles;

cooling the precursor particles to directly provide <u>first</u> fused polycrystalline particles, <u>the</u> <u>first fused polycrystalline particles</u> comprising Al₂O₃ and Y₂O₃, wherein at least a portion of the Al₂O₃ is transitional Al₂O₃, and wherein at least a portion of the Al₂O₃ and Y₂O₃ are present as a complex Al₂O₃ Y₂O₃; and

heating the <u>first</u> fused polycrystalline particles comprising Al₂O₃ and Y₂O₃ to <u>convert at</u> least a portion of the first fused polycrystalline particles to alpha alumina to provide second fused polycrystalline abrasive particles, the <u>second</u> fused polycrystalline abrasive particles <u>comprising</u>
(a) alpha alumina having an average crystallite size in a range from 1 to 10 micrometers, and (b) complex Y₂O₃: metal oxide present as a distinct crystalline phase.

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- 54. (Withdrawn) The method according to claim 53 further comprising grading the fused polycrystalline abrasive particles to provide a specified nominal grade including the fused polycrystalline abrasive particles.
- 55. (Currently Amended; Withdrawn) A method of making fused polycrystalline abrasive particles [[comprising (a) alpha alumina having an average crystallite size in a range from 1 to 10 micrometers, and (b) complex Y₂O₃ metal oxide present as a distinct crystalline phase]], the method comprising:

providing a melt comprising Al₂O₃ and Y₂O₃;

cooling the melt to provide <u>first</u> fused polycrystalline material, <u>the first polycrystalline</u> material comprising Al_2O_3 and Y_2O_3 , wherein at least a portion of the Al_2O_3 is transitional Al_2O_3 , and wherein at least a portion of the Al_2O_3 and Y_2O_3 are present as a complex $Al_2O_3 \cdot Y_2O_3$;

crushing the <u>first</u> fused polycrystalline material comprising Al₂O₃ and Y₂O₃ to provide <u>first fused polycrystalline</u> particles comprising Al₂O₃ and Y₂O₃; and

heating the <u>first fused polycrystalline</u> particles to <u>convert at least a portion of the first</u> <u>fused polycrystalline particles to alpha alumina to provide second fused polycrystalline abrasive particles, the <u>second</u> fused polycrystalline abrasive particles <u>comprising</u> (a) alpha alumina having an average crystallite size in a range from 1 to 10 micrometers, and (b) complex Y₂O₃:metal <u>oxide present as a distinct crystalline phase</u>.</u>

- 56. (Withdrawn) The method according to claim 57 further comprising grading the fused polycrystalline abrasive particles to provide a specified nominal grade including the fused polycrystalline abrasive particles.
- 57. (Withdrawn) The method according to claim 57 further comprising grading the fused polycrystalline particles comprising AhO₃ and Y₂O₃ prior to heating to provide a specified nominal.
 - 58. (Cancelled)